MIT Technology Review   Subscribe
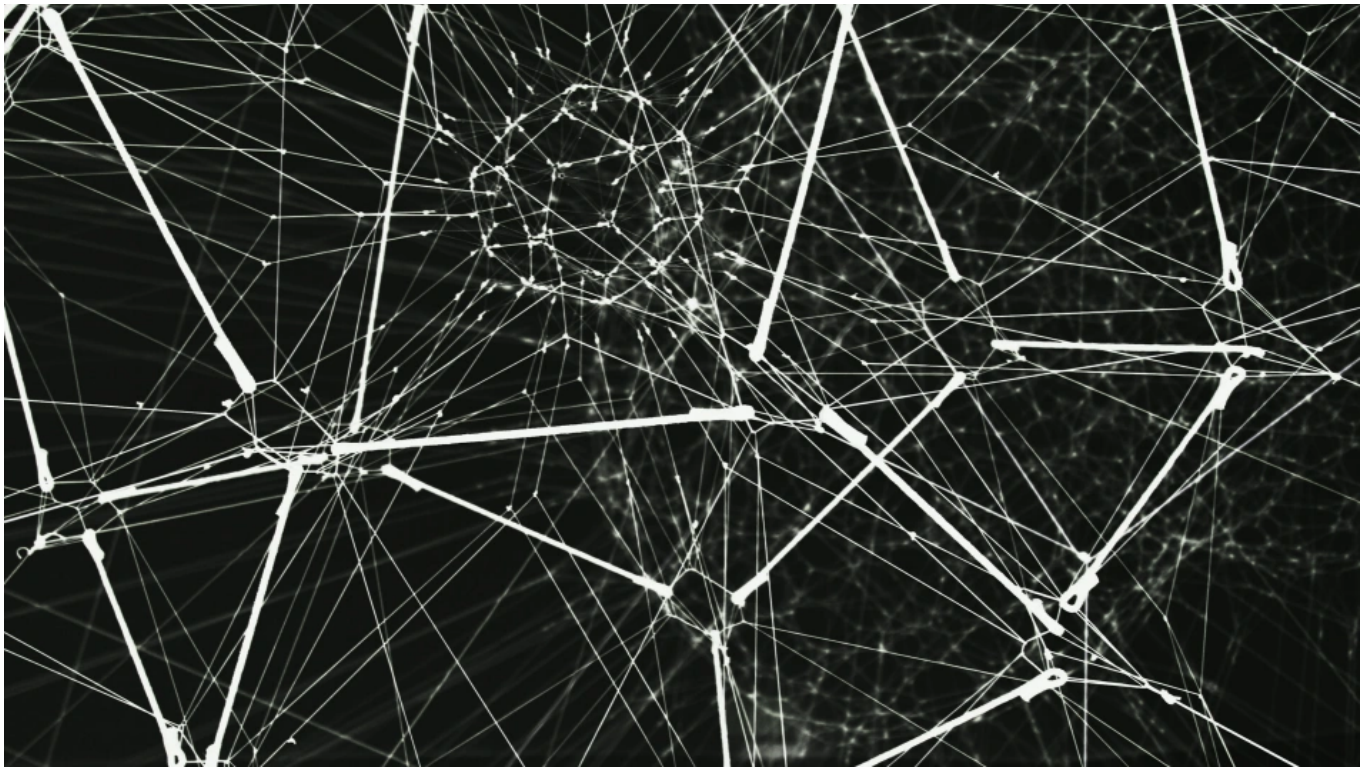
COMPUTING

A plan to redesign the internet could make apps that no one controls

Dfinity wants to allow the creation of apps that can run on the network itself rather than on servers owned by Facebook, Google or Amazon. Can it succeed where others have failed?

By **Will Douglas Heaven**

July 1, 2020

MS TECH | ALINA GRUBNYAK VIA UNSPLASH

In 1996 John Perry Barlow, cofounder of internet rights group the Electronic Frontier Foundation, wrote "A declaration of the independence of cyberspace." It begins: "Governments of the Industrial World, you weary giants of flesh and steel, I come from Cyberspace, the new home of Mind. On behalf of the future, I ask you of the past to leave us alone. You are not welcome

Barlow was reacting to the US Communications Decency Act, an early attempt to regulate online content, which he saw as overreaching. But the broad vision he put forward of a free

and open internet controlled by its users was one that many internet pioneers shared.

Fast-forward a quarter-century and that vision feels naïve. Governments may have struggled to regulate the internet, but new sovereigns have taken over instead. Barlow's "home of Mind" is ruled today by the likes of Google, Facebook, Amazon, Alibaba, Tencent, and Baidu—a small handful of the biggest companies on earth.

Yet listening to the mix of computer scientists and tech investors speak at an online event on June 30 hosted by the Dfinity Foundation, a not-for-profit organization headquartered in Zurich, Switzerland, it is clear that a desire for revolution is brewing. "We're taking the internet back to a time when it provided this open environment for creativity and economic growth, a free market where services could connect on equal terms," says Dominic Williams, Dfinity's founder and chief scientist. "We want to give the internet its mojo back."

Sign up for **The Download** - Your daily dose of what's up in emerging technology

| Enter your email, get the newsletter | **Sign up** |

Stay updated on MIT Technology Review initiatives and events?   ◯ Yes ◯ No

Dfinity is building what it calls the internet computer, a decentralized technology spread across a network of independent data centers that allows software to run anywhere on the internet rather than in server farms that are increasingly controlled by large firms, such as Amazon Web Services or Google Cloud. This week Dfinity is releasing its software to third-party developers, who it hopes will start making the internet computer's killer apps. It is planning a public release later this year.

Rewinding the internet is not about nostalgia. The dominance of a few companies, and the ad-tech industry that supports them, has distorted the way we communicate—pulling public discourse into a gravity well of hate speech and misinformation—and upended basic norms of privacy. There are few places online beyond the reach of these tech giants, and few apps or services that thrive outside of their ecosystems.

There is an economic problem too. The effective monopoly of these firms stifles the kind of innovation that spawned them in the first place. It is no coincidence that Google, Facebook, and Amazon were founded back when Barlow's cyberspace was still a thing.

The Internet Computer

MIT Technology Review   Subscribe

game consoles at the other. When you use an app, such as Zoom, software running on Zoom's servers sends data to your device and requests data from it.

This traffic is managed by an open standard known as the internet protocol (the IP in IP address). These long-standing rules are what ensure that the video stream of your face finds its way across the internet, from network to network, until it reaches the computers of the other people on the call milliseconds later.

Dfinity is introducing a new standard, which it calls the internet computer protocol (ICP). These new rules let developers move software around the internet as well as data. All software needs computers to run on, but with ICP the computers could be anywhere. Instead of running on a dedicated server in Google Cloud, for example, the software would have no fixed physical address, moving between servers owned by independent data centers around the world. "Conceptually, it's kind of running everywhere," says Dfinity engineering manager Stanley Jones.

In practice, it means that apps can be released that nobody owns or controls. Data centers will be paid a fee, in crypto tokens, by the app developers for running their code, but they won't have access to the data, making it hard for advertisers to track your activity across the internet. "I don't want to hammer the data privacy angle too much because, honestly, ad-tech continues to surprise me with its audacity," says Jones. Still, he says, the internet computer should change the game.

A less welcome upshot is that a free-for-all internet could also make it difficult to hold app makers accountable. Who is on the other end of the phone if you need to take down illegal or abusive content? It's a concern, says Jones. But he points out that it isn't really any easier with Facebook: "You say, hey, can you take down these videos? They say no. It kind of depends on how Zuckerberg is feeling that day."

In fact, a decentralized internet may lead to a decentralized form of governance, in which developers and users all have a say in how it is regulated—much as Barlow wanted. This is the ideal adopted in the crypto world. But as we've seen with Bitcoin and Ethereum, it can lead to infighting between cliques. It is not clear that mob rule would be better than recalcitrant CEOs.

Still, Dfinity and its backers are confident these issues will get worked out down the line. In 2018, Dfinity raised $102 million in a crypto token sale that valued the network at $2 billion. Investors include Andreessen Horowitz and Polychain Capital, both big players in the Silicon Valley venture capital club.

It is also moving fast. This week, Dfinity showed off a TikTok clone called CanCan. In January it demoed a LinkedIn-alike called LinkedUp. Neither app is being made public, but they make a convincing case that apps made for the internet computer can rival the real things.

MIT Technology Review   Subscribe

But Dfinity is not the first to try to remake the internet. It joins a list of organizations developing a range of alternatives, including Solid, SAFE Network, InterPlanetary File System,

Blockstack, and others. All draw on the techno-libertarian ideals embodied by blockchains, anonymized networks like Tor and peer-to-peer services like BitTorrent.

Some, like Solid, also have all-star backing. The brainchild of Tim Berners-Lee, who came up with the basic design for the web in 1989, Solid provides a way for people to keep control of their personal data. Instead of handing over their data to apps like Facebook or Twitter, users store it privately, and apps must request what they need.

But Solid also shows how long it takes to change the status quo. Though it is a less ambitious proposal than Dfinity's internet computer, Solid has been working on its core technology for at least five years. Berners-Lee talks about correcting the course of the internet. Yet overcoming the inertia of an internet pulled along by juggernauts like Google and Amazon is hard. Inventing the web is one thing; reinventing it is another.

Other projects tell a similar story. The SAFE Network, a peer-to-peer alternative to the internet in which data is shared across all the hard drives of participating computers rather than in central data centers, has been a work in progress for 15 years. An open-source community of developers have built a handful of apps for the network, including a Twitter clone called Patter and a music-player app called Jams. "My sole goal is to take data away from the corporations and put it back with the people," says founder David Irvine. But he admits that the SAFE Network itself is still nowhere near public release.

Lalana Kagal at MIT's Computer Science and Artificial Intelligence Lab, who is the project manager for Solid, admits that progress is slow. "We haven't seen as much adoption as we could have," she says.

Even when Solid is ready for full release, Kagal expects that only people who really worry about what happens to their personal data will make the switch. "We've been talking about privacy for 20 years and people care about it," she says. "But when it comes to actually taking action, nobody wants to leave Facebook."

Even within the niche communities of developers working to make a new internet, there is little awareness of rival projects. Neither Irvine nor the three people I emailed who had worked on Solid, including Kagal, had heard of Dfinity. People I spoke to at Dfinity had not heard of the SAFE network.

It's possible that the internet may be forced to change whether the average user cares or not. "Privacy regulations could become so restrictive that companies will be forced to move to a more decentralized model," says Kagal. "They might realize that storing and collecting all this personal information is just not worth their while anymore."

MIT Technology Review   Subscribe

advertising, which determines both the minutiae of data collection and the balance of power at the top. Dfinity believes that making the internet a free market again will lead to a boom in

innovation like the one we saw in the dot-com days, with startups exploring new ways to make money that don't rely on indiscriminate processing of personal data. Kagal hopes that more people will choose to pay for services rather than using freemium ones that make money from ads.

None of this will be easy. In the years since Barlow wrote his polemic, the data economy has sunk deep roots. "It would be great if it was replaced with Solid," says Kagal. "But it would be great if it was replaced with something else as well. It just needs to be done." T

by Will Douglas Heaven

DEEP DIVE

COMPUTING
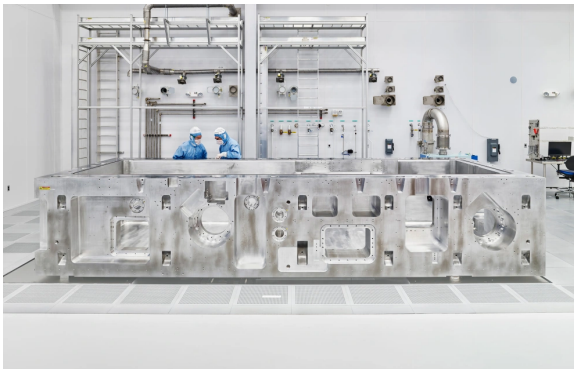
Inside the machine that saved Moore's Law
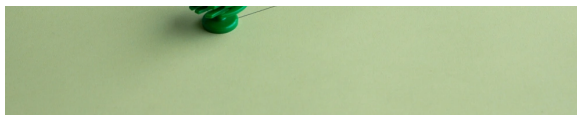
The Dutch firm ASML spent $9 billion and 17 years developing a way to keep making denser computer chips.

By Clive Thompson

MIT Technology Review   Subscribe
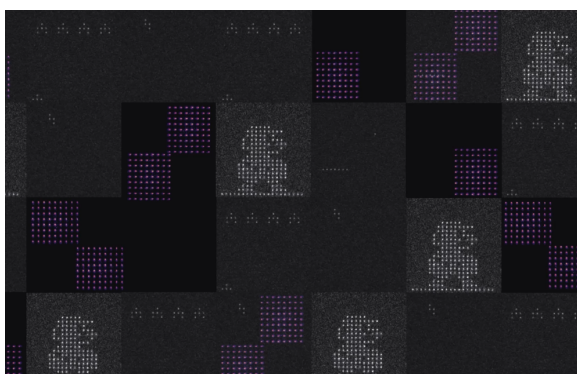
The 50-year-old problem that eludes theoretical computer science

A solution to P vs NP could unlock countless computational problems — or keep them forever out of reach.

By Siobhan Roberts

This new startup has built a record-breaking 256-qubit quantum computer

QuEra Computing, launched by physicists at Harvard and MIT, is trying a different quantum approach to tackle impossibly hard computational tasks.

By Siobhan Roberts

MIT Technology Review   **Subscribe**

The US is worried that hackers are stealing data today so quantum computers can crack it in a decade

The US government is starting a generation-long battle against the threat next-generation computers pose to encryption.

By Patrick Howell O'Neill

STAY CONNECTED

Illustration by Rose Wong

Get the latest updates from MIT Technology Review

Discover special offers, top stories, upcoming events, and more.

Enter your email

$\rightarrow$

Privacy Policy

MIT Technology Review

Subscribe

Our mission is to bring about better-informed and more conscious decisions about technology through authoritative, influential, and trustworthy journalism.

Subscribe to support our journalism.

About us	Help & FAQ
Careers	My subscription
Custom content	Editorial guidelines
Advertise with us	Privacy policy
International Editions	Cookie statement
Republishing	Terms of Service
MIT News	Contact us

Cover Art by Peter Crowther Associates

© 2021 MIT Technology Review